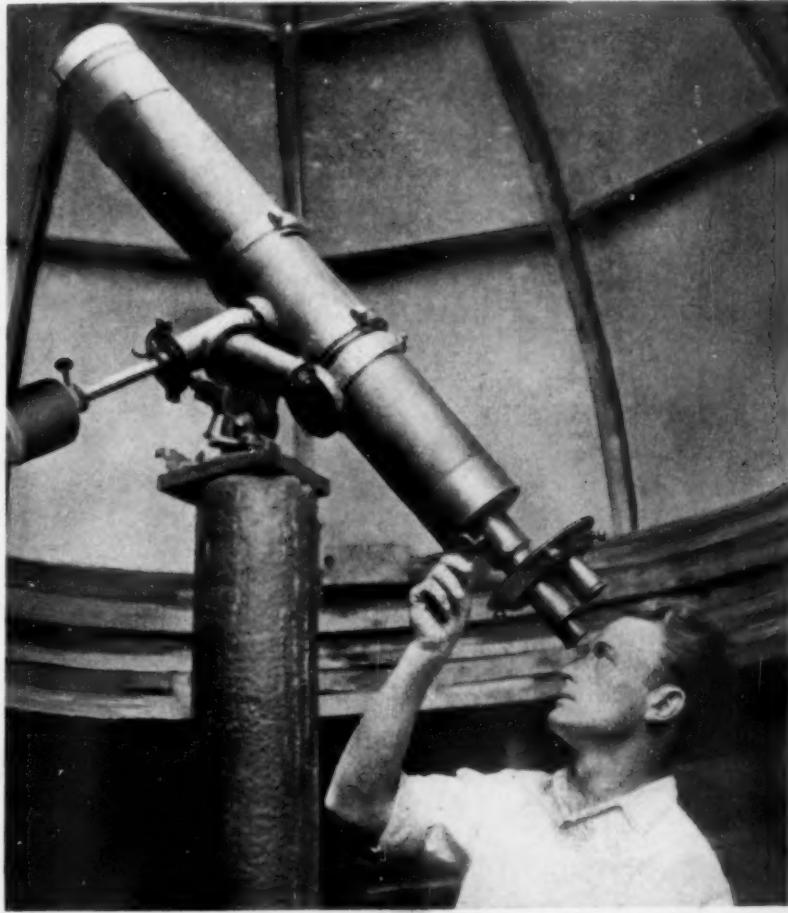


RICE
15¢

PERIODICAL ROOM
GENERAL LIBRARY
UNIV. OF MICH.

SCIENCE NEWS LETTER

THE WEEKLY SUMMARY OF CURRENT SCIENCE•



Comet Discoverer

See Page 24

JULY 11, 1936



A SCIENCE SERVICE PUBLICATION

SCIENCE NEWS LETTER

Vol. XXX



No. 796

The Weekly

Summary of

Current Science

Published Every Saturday by

SCIENCE SERVICE
2101 Constitution Avenue
Washington, D. C.

THE INSTITUTION FOR THE POPULARIZATION OF SCIENCE organized 1921 as a non-profit corporation, with trustees nominated by the National Academy of Sciences, the National Research Council, the American Association for the Advancement of Science, the E. W. Scripps Estate and the journalistic profession.

Edited by WATSON DAVIS

Subscription rates—\$5.00 a year postpaid; two years \$7.00; 15 cents a copy. Ten or more copies to same address, 5 cents a copy. Back numbers more than six months old, 25 cents.

Canadian subscribers please add 50 cents a year, foreign subscribers 75 cents a year to regular subscription rate to cover postage.

Members of the American Association for the Advancement of Science have the privilege of subscribing to SCIENCE NEWS LETTER at the reduced price of \$3 per year. Application for this privilege should be accompanied by privilege card obtained from the Permanent Secretary, A.A.S., Smithsonian Institution Building, Washington, D. C.

In requesting change of address, please give your old address as well as the new one in notification to Circulation Department, SCIENCE NEWS LETTER, 2101 Constitution Ave., Washington, D. C., at least two weeks before change is to become effective.

Copyright, 1936, by Science Service, Inc. Reproduction of any portion of the SCIENCE NEWS LETTER is strictly prohibited. Newspapers, magazines and other publications are invited to avail themselves of the numerous syndicate services issued by Science Service.

Cable address: Sciservce, Washington.

Entered as second class matter at the post-office at Washington, D. C., under the act of March 3, 1879. Established in mimeographed form March 13, 1922. Title registered as trademark, U. S. and Canadian Patent Offices.

Advertising rates furnished on application.

Member Audit Bureau of Circulations.

Board of Trustees of Science Service

Honorary President, William E. Ritter, University of California. Honorary Vice-President, Vernon Kellogg, National Research Council. Representing the American Association for the Advancement of Science, J. McKeen Cattell, President, Editor, Science, Garrison, N. Y.; Burton E. Livingston, Johns Hopkins University; Baltimore, Md.; Henry B. Ward, Permanent Secretary, A.A.S. Representing the National Academy of Sciences, W. H. Howell, Vice-President and Chairman of Executive Committee, Johns Hopkins University, Baltimore, Md.; R. A. Millikan, Director, Norman Bridge Laboratory of Physics, California Institute of Technology, Pasadena, Calif.; Harlow Shapley, Director, Harvard College Observatory, Cambridge, Mass. Representing National Research Council, Ludvig Hektoen, John McCormick Institute for Infectious Diseases, Chicago, Ill.; C. G. Abbot, Secretary, Smithsonian Institution, Washington, D. C.; Harrison E. Howe, Editor of Industrial and Engineering Chemistry, Washington, D. C. Representing Journalistic Profession, John H. Finley, Associate Editor, New York Times; Mark Sullivan, Writer, Washington, D. C.; Marlen E. Pew, Editor of Editor and Publisher, New York City. Representing E. W. Scripps Estate, Harry L. Smithson, Treasurer, Cincinnati, Ohio; Robert P. Scripps, Scripps-Howard Newspapers; West Chester, Ohio; Warren S. Thompson, Miami University, Oxford, Ohio.

Staff of Science Service

Director, Watson Davis; Staff Writers: Frank Thone, Emily C. Davis, Jane Stafford, Marjorie Van de Water, Robert Potter; Astronomy writer, James Stokley. Correspondents in principal cities and centers of research. Librarian, Minna Gill; Sales and Advertising Manager, Hallie Jenkins.

DO YOU KNOW?

Snow and ice are combined in true hailstones.

Horns of sheep appear triangle-shaped if examined in cross-section.

Some of the coal seams in Pennsylvania's anthracite mines are 100 feet thick.

Argentina is to spend 90 million dollars on a road building program, to continue five years.

Japanese raincoats that sell for about 25 cents are being made of paper impregnated with tung oil.

An anteater walks comfortably on its knuckles, saving its sharp claws for tearing up ant and termite nests.

More than 300 bird-lovers are helping the Michigan Audubon Society to take a bird census of that state.

There is on the average one filling station to every mile and a half of surfaced highway in the United States.

Carpet beetles, also called buffalo bugs, are pronounced second to clothes moths in damaging household fabrics.

A new-type telescoping wagon tongue enables one farmer with a mechanical picker to pick, haul and crib a corn crop conveniently.

The most northerly part of the British Empire is Ellesmere Island, in the Arctic.

It takes some young butterflies only ten minutes to escape from the chrysalis and be ready for flight.

To give bathtubs a non-skid surface a manufacturer embosses serpentine waves on the floor of the tub.

Snowshoe rabbits that nip young trees are a serious cause of loss in forest plantations of the Lake States.

A research center on ancient man, to learn more about origins of the human race, is to be formed by the Philadelphia Academy of Natural Sciences.

Health officials have shown conclusively that faulty plumbing installations and fixtures can lead to pollution of water supplies.

When Japanese beetles arrived in this country in 1915, they found no disease or natural enemies to stop their progress; but now several organisms have been discovered that spread disease among beetle larvae in the soil.

Along the highways of 37 states, 450 emergency first aid stations are now being operated by the American Red Cross, and locations have been selected for 3,175 more.

WITH THE SCIENCES THIS WEEK

Most articles are based on communications to Science Service or papers before meetings, but where published sources are used they are referred to in the article.

AGRICULTURE

What is the condition of vegetation in the drought area? p. 19.

ARCHAEOLOGY

Did American Indians build pyramids? p. 24.

Where did the log cabin quilt design come from? p. 25.

ASTRONOMY

What manufacturing process is going on inside stars? p. 22.

Who is Leslie C. Peltier? p. 24.

AVIATION

Are double-decker aircraft being seriously considered? p. 25.

CHEMISTRY

Can the virus causing tobacco mosaic be rendered harmless? p. 24.

Where is oil used in solid form? p. 21.

CLIMATOLOGY

Is the climate of the United States becoming permanently drier? p. 20.

COMPARATIVE PSYCHOLOGY

Do chimpanzees receive training from their mothers? p. 26.

MEDICINE

Does the blood of cancer patients differ from that of normal persons? p. 22.

Will sunbaths cause cancer in human beings? p. 22.

METALLURGY

How much electric power is used by a modern steel mill? p. 23.

PHYSICS

How much electricity is carried on the surface of human red blood cells? p. 28.

PSYCHOLOGY

How do psychologists plan to study social problems such as war and unemployment? p. 29.

AGRICULTURE

Reports From "Drought Front" Tell State of Vegetation

"Bad Water," "No Grass—Not Even Russian Thistles," "Wheat Shriveled, Corn Now in Danger"—So Replies Run

TO OBTAIN really authentic information about the drought and its effects on both agriculture and natural vegetation, Science Service asked five scientists—ecologists and agronomists—in the five states from North Dakota to Oklahoma for brief summary statements of conditions as they saw them and received reports. Following are their answers, as of the first days in July.

By PROF. L. R. WALDRON, Agronomist, North Dakota Agricultural College

THE SOUTHWESTERN half of North Dakota, which carried above one million animal units in 1935, is now nearly devoid of feed.

This same area, with 63 per cent of its acreage a total failure and the balance

with very low yields in 1934, suffered heavy stem-rust loss to wheat last year, and this year faces practically total failure.

Most of the remainder of the state is in bad condition, with total failures almost certain in large areas. Only a few inches of soil was moist this spring and this was rapidly taken by the growing crop and high temperatures. The short growing season precludes growing very late-sown catch crops, such as the sorghums, and these depend upon rain.

The wheat and flax crops of the state furnish nearly all of the cash crop income. Flax will suffer more than wheat. Corn is holding out well in areas, but this crop is grown mainly in the drier southern area. Water supplies are in very serious condition. Bad quality of water is combined with scarcity.



DROUGHT BRINGS DESOLATION

The twin evils, drought and grasshoppers, have brought destruction such as this to farms in the Dakotas. Whole fields have been stripped of their crops, leaving the fields practically bare. Dust storms add to the horrors. Even the weeds along the fence have been destroyed. This is an official Government photograph taken for the Resettlement Administration by Carter.

Drought overshadows any threats of insects or plant diseases. Farming this spring was started on a shoestring, and another one must be supplied from Washington next year. The problem is very grave and no satisfactory solution seems at hand.

By PROF. S. P. SWENSON, Agronomist, South Dakota Agricultural College

THE AVERAGE June rainfall for the state this year was about two-tenths of an inch, most of it in the east central and southeastern sections. Small grain is ruined, except that in the extreme east central and southeastern areas. Corn crop prospects are good within a slightly larger area, but need rain soon.

The forage situation is acute except in the east central and southeastern counties. There is no grass or legume forage in the stricken areas—not even Russian thistles west of Huron.

Livestock numbers on ranges are about as high as before the 1933 drought shipment. The cattle must be sold, moved, or depend on relief feed for the remainder of the year.

It is too dry for emergency forage crops. Farmers have been advised to cut all vegetation for roughage. Most areas are dependent on shipping in feed. Some localities have a little hay carried over from last year. Some ranchers are looking for pastures in other sections.

By PROF. J. E. WEAVER, Ecologist, University of Nebraska

DEVELOPMENT of the natural prairie vegetation is an excellent indicator of the intensity of drought.

The extreme drought of 1934 left many bare areas in the grasslands and all but swept away most of the least drought-resistant species. The dry early spring and later summer of 1935 witnessed great increases in needlegrass, western wheat grass, and the invasion of a host of weeds. The favorable spring of 1936 promoted an abundant growth and emphasized the great changes in the prairie flora.

Expectations of normal yields were decreased after June. During a month of very light rainfall, soil moisture has been reduced at all depths to six feet until the wilted grasses are now in a condition reached in early May during the great drought of 1934.

Scattered showers characteristic of drought years have modified conditions locally, but recent study shows that

lack of water in soil and subsoil is common from western Iowa across Kansas and Nebraska and eastern Colorado.

By DIRECTOR L. E. CALL, Agronomist, Kansas Agricultural Experiment Station

DROUGHT in Kansas is only now approaching a critical stage. Good rain during the fall of 1935 supplied subsoil moisture through central and eastern Kansas that carried the crops through the early spring months. Rainfall in May, especially heavy in central and western Kansas, supplied moisture that was needed to mature the wheat crop, to produce a good growth of native pasture grasses, and to assure good stands and early growth of row crops.

The crops have therefore passed through the month of June, which has been excessively hot and dry, without serious loss except to wheat and barley in the western sections of the state where these crops were immature and have suffered more from high temperatures than from drought.

General, well-distributed rains, followed by lower temperatures, would assure excellent crops of corn and sorghum. These crops, however, are now reaching a critical condition. A continuation of present high temperatures and drought will result in serious losses.

Crop production up to this time assures a less critical feed shortage than occurred in 1934. More grain has been produced, pastures are better, and row crops fully as promising. July and August rainfall will determine the production of these crops. It is not too late to produce an average crop in Kansas.

By PROF. PAUL B. SEARS, Ecologist, University of Oklahoma

PLANT life in a grassland region depends largely upon moisture stored in soil before the growing season begins. At the beginning of this growing season, the soil was drier than in many years, having been depleted by successive dry years.

In places the growing of alfalfa has had to be abandoned because it depletes soil moisture reserve even in favorable years. It will take more than one year of good rain to restore soil moisture reserves.

East of the short-grass area in Oklahoma, spring rains have favored wheat, but much of it was stunted and shriveled, and corn is now in danger. Along

the mountain front in Colorado, abundant snow insures irrigation and well-filled reservoirs this year.

Managers of large tracts agree that native grassland is their most dependable source of income, because it is adjusted to drought and other hazards. Extensive restoration of native grasses and restriction of field crops to areas of

favorable soil moisture should be good drought insurance.

Studies of weather records and tree rings here show that recurring groups of dry years are a normal phenomenon in grassland states, and must be taken into account in any permanent policy of land use.

Science News Letter, July 11, 1936

CLIMATOLOGY

U.S. Climate Not Changing— We Are Just in "Dry Phase"

By J. B. KINCER, Chief of the Division of Climate and Crop Weather, U. S. Weather Bureau

IT HAS been said that the usual weather is unusual; and the only trouble with our recent weather is that it has been more unusual than it usually is unusual.

The unusual happenings in recent years include these:

1. Extremely high summer temperatures.
2. Many warm winters, to be followed by an extremely severe one in 1935-1936.
3. Recent, unprecedented floods in the East.
4. Disastrous tornadoes in the South.
5. Three drought years, 1930, 1934, and 1936, establishing new records for dryness over large areas, all of which were of tremendous national significance.

Because of these things, many people have grown alarmed and express fear for the future.

We have weather records for more than 5,000 different localities in the United States, but unfortunately a very few are for periods as long as 100 years. Our longest records indicate that there has been no permanent change in climate. Rather, we are going through a dry phase of our normal climate.

Climate Doesn't Change

Climate is the general run, or sum total, of weather, and that sum total does not seem to be undergoing any fundamental changes. Weather is the phase of climate that we experience from day to day, from week to week, or even year to year. Therefore, as everyone knows from reading the Weather

Bureau forecasts, as published in every daily newspaper in the country, weather varies, often markedly, from day to day, due to vast changes in air mass movements.

When the run of weather conforms to the general climate of a region, that is, when it is about normal, it receives very little attention or discussion. But when it varies greatly from the normal in heat, cold, destructive floods, drought, and the like, it at once becomes of popular interest, and in some cases of national concern.

Now, we readily observe that different weather phases—warm, then cool; cloudy and rainy, then sunny and dry—follow one another at intervals usually counted in days or weeks; that is, at short intervals. This we call weather trends.

Dry, Warm Phase

There are climatic trends of a similar nature, the yardstick being years instead of days. In recent years, we have been going through a dry, warm phase of climate and unusually frequent drought is the result.

These up and down trends in rainfall make, when the record is smoothed, a wave-like pattern, but the length of the periods appears to be too irregular to justify a definite long-range forecast as to what will happen in the future. If records were available for a thousand years instead of from 50 to 100, we possibly could discover a definite law of succession.

The Bible, in the story of Joseph and the dreams of Pharaoh, gives us the first historical reference to this important characteristic of rainfall—the tendency of a number of successive years having comparatively heavy rains to be

followed by a series of harmfully dry years, especially in regions with normally scanty moisture.

In the United States, local droughts may be expected practically every year, but they are seldom of nation-wide importance. Prior to 1934, three wide-

spread droughts are worthy of mention as seriously affecting production of staple farm crops in the United States. These droughts of national importance occurred in 1894, 1901, and 1930. The fourth, in 1934, broke all records.

Science News Letter, July 11, 1936

CHEMISTRY

Discover Way to Burn Novel Alaskan "Lump" Oil

BLACK gold and yellow gold—these may combine to make the bleak Arctic coast, America's last frontier, a modern Eldorado.

So, at any rate, believes Master Sergeant Stanley R. Morgan of the United States Army Signal Corps, who has announced the successful completion of experiments in "breaking down" heavy surface oil found in vast lakes under the shadow of the North Pole.

Sergeant Morgan, whose quick action in reporting the fatal crash of Wiley Post and Will Rogers last fall resulted in promotion and a long leave from his radio station at Point Barrow, is now in Seattle awaiting the breakup of the Arctic ice pack in July so that he and his family can go "home."

While in Seattle, he has been working on experiments with this strange northern oil. It is so heavy—virtually a solid—that pieces can be broken off and burned.

Fuel is the big problem of both natives and whites on the Arctic coast. The whites (only 25 on the entire coastline of more than 1000 miles) burn imported coal at the rate of \$45 a ton. The Eskimos use whale oil, but the whales are rapidly diminishing. When the supply is gone, the natives will move or die out. There is no timber at all for hundreds of miles around.

As a result of Sergeant Morgan's experiments, the Bureau of Education of the Interior Department is contemplating the installation of a plant at Point Barrow to refine the Arctic oil, which, because of its seepage nature, is difficult to burn in its natural state.

Refining Process Simple

"The process of refining this oil is necessarily simple," Sergeant Morgan says, "as the natives could not afford an expensive plant or process."

"The oil contains approximately 40 per cent residue and moisture, but I have found that it separates under com-

paratively low temperature (250 degrees Fahrenheit) through a boiling process. The oil is then drawn off, given an inexpensive acid treatment, allowed to settle 36 hours, and is ready for use."

The residue, carbon resin and silt, also is usable—in the form of briquets.

A stove actually burns the oil in Sergeant Morgan's laboratory. The burner, of a gravity feed natural draft type, is so simple that the Eskimos will manufacture their own.

The oil supply is "unlimited," lying in lakes about 50 miles southeast of Point Barrow. One lake is five miles in diameter, and there are at least two other smaller ones. Their origin is

cloaked in the mystery of the northland, but they undoubtedly have been there for hundreds or thousands of years. No one has ever measured their depth, but Sergeant Morgan says a scientific expedition has been proposed to explore the bottom of the lakes for prehistoric fossils.

He also says he has plenty of concrete evidence that the Endicott Mountains, south of Barrow, are highly mineralized with copper and gold. He believes that development of his oil fuel, along with snowmobiles for transportation, will open the Arctic coast to mining pioneers.

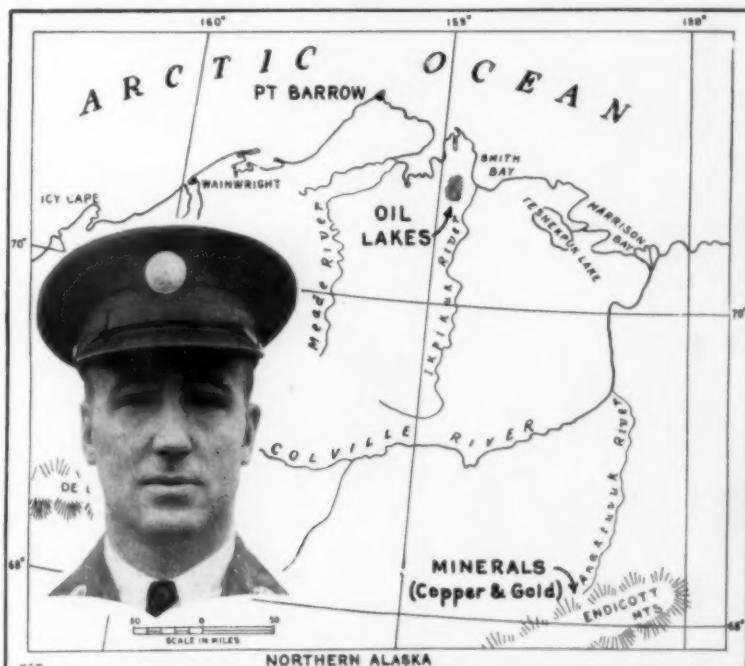
The snowmobile is an ordinary auto rigged with skis forward and tractor treads aft.

Science News Letter, July 11, 1936

ASTRONOMY

Stars Are Factories For Making Radiated Energy

TH E INSIDE of a star is a factory which makes complex elements out of the simplest element of all, namely, hydrogen. This is the point of view presented to the meeting of the American Physical Society in Seattle by Dr. R. M. Langer of the California Institute of Technology. (Turn to next page)



WHERE LUMP OIL IS FOUND

Far north in Alaska and within 50 miles of Point Barrow are the strange seepage oil lakes from which native Eskimos and the few white settlers obtain the heavy "lump" oil which offers a potential source of fuel in the Arctic. The insert shows Master Sergeant Stanley Morgan, who has developed a simple stove for burning the "lump" oil.

The output of the factory is not complex elements but energy which is radiated away as the star shines a few billion years. The complex atoms are left behind mostly in the form of iron. Only a minute fraction of the energy of a single star, the sun, is caught by our earth and this energy is what makes our factories work to make complex things out of simple ones.

The stellar factory would blow up in its enthusiasm for energy production were it not for the stabilizing effect of the complex atoms. Of these the most important stabilizer is heavy hydrogen. When things get too hot heavy hydrogen breaks up into a neutron and an ordinary hydrogen atom and things are back where they started.

It is this accident of the balance between neutrons and deutons which determines how hot the star becomes and how long it lives. The internal temperatures are about half a billion degrees and the life is several billion years. According to Sir James Jeans the stars shine much longer than that but few agree with him. No process known to

happen is competent to keep a star going over ten billion years. No process known is able to heat a star over a billion degrees, Dr. Langer pointed out, because the radiation at that temperature would exhaust any process ever suggested before that temperature would be reached.

At these high temperatures matter is quite different from the matter we know. No compounds exist. No solids or liquids are possible. Neutrons, positive electrons, and deutons, all newly-discovered and rare on the earth, abound. Above all and predominating everything, photons of light fierce as X-rays rage to and fro. Nothing is safe from their influence. They create matter and are created by matter. Things are so lively that we can never hope to make any direct experiments under these conditions. Yet the basis for Dr. Langer's calculations are the experiments which are being made in many laboratories with comparative ease shooting atoms at one another at high speed and scoring the hits.

Science News Letter, July 11, 1936

MEDICINE

Advances in Cancer Fight Are Reported by Scientists

THREE significant advances in the fight against cancer have just been reported by medical scientists. (*American Journal of Cancer*, June.)

A difference between the blood plasma in healthy persons and in patients suffering from cancer can be detected by the use of an instrument of modern physics, the spectrograph, Alexander J. Allen, Rachel G. Franklin and Edward B. Sanigar of the Biochemical Research Foundation of The Franklin Institute, Philadelphia, reported. Similar differences were found by this method in blood plasma from cancerous and normal animals. The difference is considered due to an increase in the fibrinogen-globulin content in the blood in cancer.

Occurrence of both cancer and leukemia in mice following injection of the cancer-causing coal tar compound, water-soluble 1:2:5:6-dibenzanthracene, was reported by Drs. Harold Burrows and J. W. Cook of the London Free Cancer Hospital. Occurrence of leukemia is the interesting feature, since this fatal disease characterized by greatly increased numbers of white blood cells

is thought to be similar to cancer. The experiments were preliminary ones designed to determine the cancer-causing potency of a new dibenzanthracene compound. Consequently the British scientists believe it is too early to state that this compound caused the leukemia, though this seems possible.

Further information on the role of hormones in the causation of cancer was obtained in studies by Drs. V. Suntzeff, E. L. Burns, Marian Moskop and Leo Loeb of Washington University School of Medicine, St. Louis. Long continued injections of the female sex hormone, estrin, increases the incidence of breast cancer in mice, these investigators found. The effect varies directly with the size of the dose and the hereditary tendency of a given strain to cancer. Cancer of the mammary glands was produced "at least as readily" by injections of female sex hormone in male mice of high tumor strains as in non-breeding females of the same strain. This shows that the breast of male mice is hereditarily at least as predisposed to cancer as the female gland.

Science News Letter, July 11, 1936

MEDICINE

Sunbaths Declared Not Likely to Cause Cancer

WITH the opening of the vacation season comes the reassuring news that prolonged exposure to sunlight via the popular sunbaths is not likely to cause cancer. This opinion is expressed by Drs. Howard H. Beard, E. Von Haam and Thomas S. Boggess of the Louisiana State University Medical Center in a report to the *American Journal of Cancer* (June).

Cancer does occur in rats after prolonged exposure to ultraviolet rays, either from the sun or artificially produced, the Louisiana scientists report. Their experiments confirm similar results obtained by scientists elsewhere. However, they point out that these experiments do not justify the widely publicized conclusion, reached by a committee of the Academy of Medicine of Paris and other scientists, that sunlight and sunbaths may have dangerous cancer-producing possibilities for the human race. Rats and men do not respond in the same way to sunlight, they point out.

"Since the normal habitat of the rat is darkness, it is to be expected that this animal would be more sensitive to the ultraviolet rays than would man," the Louisiana scientists state. "It is generally believed that one year in the life of the rat is comparable to thirty years in the life of man. It required, on an average, about seven months of continuous irradiation to produce cancerous changes in the rat, which would be equivalent to twenty hours daily ultraviolet irradiation for about eighteen years in the case of man."

"Moderate amounts of sunlight have been shown to be essential to health. Only after results similar to those recorded (cancer production in rats by ultraviolet light) have been obtained on animals which are as accustomed to, and as greatly benefited by, sunlight as is the human being, can the evidence be considered sufficient for similar conclusions."

Science News Letter, July 11, 1936

Moose have the right of way on tracks of the Alaska railroad serving Mount McKinley National Park, and trains slow down to let them amble off the tracks.

The epidemic of amebic dysentery which started in Chicago in 1933 has been the only known extensive epidemic of this disease in a civilian population.

METALLURGY

Steel Strip Mill Controlled By Powerful Electric Motors

Gone are the Back-Breaking Roasting Tasks of the Industry's Past; Man Now Has His Place at Controls

MAN and machine reach new heights of coordination in a steel strip mill, such as was exhibited in Lackawanna, N. Y., near Buffalo, to a group of newspapermen by the Bethlehem Steel Company. Human brains and skill, both in design and operation, combine with precise and delicate control of large electrical power to roll in a few minutes a thick slab into a lengthy strip of steel sheet metal.

To see a red-hot chunk of steel pass successively through eleven huge sets of rollers, that squeeze it thinner, wider and much longer, is one of the best spectacles of modern industry. Clouds of steam arise from the cooling water sprays on the rolls, electric switches click, and the long radiant carpet of metal rushes down a path of smooth-running rollers to be coiled automatically like so much adding machine tape. Two and a half tons of steel ribbon, not touched by human hand or brawn, the creation of human brains and skill.

Behind this rapid metamorphosis of crude steel into sheets for automobiles, refrigerators, furniture, and a hundred other products, is precise electrical control. The modern rolling mill would be impossible without the flexibility and responsiveness of motors, thousands of them, mounted upon the machines. In a lofty central room, "pulpit" to steel men, where he may survey the whirling mill below, is the god of the machine, the operator, playing with skillful mind and fingers on the bank of switches that are masters of the wheels below. In a vast electrical room, giant motor-generator sets whir, giving the direct current that drives the machines.

35,000 Horsepower

As much power is used by a strip mill as by a large ocean liner, some 35,000 horsepower for the new Bethlehem mill. Without the development of electrical power devices, particularly the direct current motor precisely controlled by resistance changes, such modern strip and sheet mills would not be possible.

Do not imagine that the human element is entirely lacking. Automatic

as the machine appears in its smooth operation, constant manual adjustment is necessary in order that the strip may flow out smoothly. Essential is the proper relative motion of the squeezing rolls, speeding up as the rolling proceeds, and this fine adjustment is made by the human operator, second by second. And man had to make the machine.

Months and years of engineering experience were necessary to produce the American-developed continuous strip-sheet mill, of which there are now about twenty, besides the new one that arose in less than a year on waste land in Lackawanna.

Man-Power Needed

The brawn of strong young arms is still necessary in the game of steel, but gone are the backbreaking, roasting

tasks that Charles M. Schwab, veteran steel man, reminisced about when he saw the Lackawanna mill for the first time. Labor per ton of steel produced has been vastly reduced, yet leaders like E. G. Grace, president of the Bethlehem Steel Company, remind that more men than ever are employed in making steel. More steel per man employed, they argue, when it goes out into industry, creates more jobs. It will, to be sure, if purchasing power allows the public to gratify yens for more things of steel.

This recurring adjustment of man to new machines is one of the most troublesome situations confronting modern life. The machines are marvelously built and controlled. Better engineering of the human labor element is another and less solved problem.

Science News Letter, July 11, 1936

EVOLUTION

Chinese Deserve Credit For Aid to Evolution Idea

CHINA deserves credit for helping to launch the theory of evolution, concludes Prof. A. H. Rowbotham of the University of California. It was the influence of China on European thought in seventeenth and eighteenth centuries, he says, that paved the way for ultimate development of Darwin's famous theory.

Science News Letter, July 11, 1936



SQUEEZE OUT RED CARPET OF STEEL

In foreground large sets of rollers are the "roughing trains" that make the first reductions of thickness. Thin sheets are produced by the six "mills" farther along. Notice how small comparatively is the man standing on a platform at the right of the room toward the rear.

CHEMISTRY

Virus Chemical Disarmed Without Destroying It

DISARMING without destruction of the newly discovered protein causing a virus disease in tobacco has been accomplished by Dr. W. M. Stanley, of the Rockefeller Institute for Medical Research laboratories.

Dr. Stanley recently demonstrated that a crystalline substance, protein in nature, has the properties of the hitherto invisible virus causing tobacco mosaic disease. Medical scientists were much interested because the plant disease seems to be similar to human virus diseases, among them infantile paralysis, smallpox, and encephalitis. The non-living protein seemed to actually "grow" or increase in amount in the plant as though it were alive.

Now Dr. Stanley has reported (*Science*, June 26), that treating the disease-producing protein with mild agents, including ultraviolet light, hydrogen peroxide, formaldehyde and nitrous acid, makes it harmless although it is still definitely protein in nature. Dr. Stanley believes that a very slight change in the chemical structure of the protein takes place, enough to rob it of its ability to produce disease.

Science News Letter, July 11, 1936

ASTRONOMY

Peltier Comet Becomes Visible to Eye on July 14

See Front Cover

ONE of the most spectacular celestial displays since famous Halley's comet swept the sky in 1910 will be the appearance of the new Peltier comet to observers using only their own eyes, about the middle of July.

On the night of May 14, Leslie C. Peltier, of Delphos, Ohio, one of America's best-known comet hunters (with four comet discoveries then already to his credit), was scanning the northeast sky with his small telescope. Just below the constellation of Cepheus east of the North Star he saw a blurry, diffuse glow which was out of place in the well-charted vistas of the sky. From a little after 10 p.m. until 1 a.m. he watched it, although at first it seemed not to move. Its motion, if any, was extremely slow. On the morning of May 15, Peltier wired to Dr. G. Van Biesbroeck of Yerkes Observatory, Williams Bay, Wisconsin, this cryptic message:

"Verify extremely slow motion ninth

magnitude comet, 23 h 59 m plus 74 degrees."

The hours and minutes, with the degrees sign, told Dr. Van Biesbroeck where to turn the large 40-inch diameter refracting telescope of Yerkes in the sky and confirm the find.

For nearly two months now astronomers have been watching the new comet nightly through their instruments. Gradually it has been coming nearer to the earth and getting brighter. Soon the naked eye, instead of a small telescope, should serve for observation.

Dr. Fred L. Whipple of the Harvard Observatory staff estimates that by July 20 the Peltier comet will easily be visible and on August 4 it will reach its peak brightness, flashing to a magnitude of 3.5. At this time it will be just about as bright as the fainter stars in the familiar Big Dipper, or one quarter as brilliant as the North Star.

When first discovered the Peltier comet was 120,000,000 miles from the earth. At its nearest distance on August 4 it will be only 16,000,000 miles away, hardly one-sixth of the distance between the sun and earth.

The comet is still located near the constellation of Cepheus where it was first sighted, but it is moving across the heavens toward the Milky Way where it will be located during most of its visible epoch. During the last stages of its "life," from the standpoint of visibility to the eye, it will move through the constellation of Pegasus near the northeastern horizon. (See *SNL*, June 27, for maps showing its location.)

The cover illustration shows the comet's discoverer at his telescope.

Science News Letter, July 11, 1936

NUTRITION

Apples Differ in Content Of Vitamin C

NEW experiments with apples revealing that different apple varieties show marked differences in the amount of vitamin C they contain were reported to the meeting of the American Home Economics Association.

Using guinea pigs to test the nutritive value of western apple varieties, Dr. E. N. Todhunter of the State College of Washington, reported that apples lose vitamin C when stored. Destruction of vitamin C, he said, increases with the length of time apples are kept in storage and is progressively greater with storage temperatures above 32 degrees Fahrenheit.

Science News Letter, July 11, 1936



ARCHAEOLOGY

Carve Slices From Great Indian Pyramid in Illinois

ATWO-ACRE Indian pyramid near Metropolis, southern Illinois, is to be sliced and tunneled by exploring archaeologists from the University of Chicago.

Excavations will reveal whether the great flat-topped pyramid, 40 feet high, contains evidences of prehistoric Indian life in the region, or whether it was raised merely as a high earthen foundation for ceremonial buildings.

Dr. Thorne Deuel, of the University, is directing the expedition, which consists of 14 young student archaeologists.

The Kincaid mounds, where the great mound is located, are believed to have been an important center of Indian trade in the upper Mississippi Valley, and previous excavations have shown that the earth ten feet deep is sown with debris of human occupation. The lost cemetery of the ancient settlement is also to be sought.

Science News Letter, July 11, 1936

AERONAUTICS

International Prize Given For Rocket Research

ENGINEERING formulae and designs for a rocket calculated to reach a height of seven miles have won for an American engineer, Alfred Africano, the five-thousand-franc International Rep-Hirsch Prize. Official announcement of the award was made in Paris on June 29 by the Astronomical Society of France.

The award was made jointly to Mr. Africano and the American Rocket Society, of which he is vice-president. The work of the Society is not aimed at romantic "trips to the moon" but at the more sober scientific objectives of devising rockets useful in the investigation of the earth's upper atmosphere.

The International Rep-Hirsch Prize was founded by two Frenchmen, Robert Esnault-Pelterie, airplane engineer and manufacturer, and Andre Hirsch, banker.

Science News Letter, July 11, 1936

EE FIELDS

SEISMOLOGY

Quake North of Japan Recorded by Instruments

A SEVERE earthquake occurred in the region of the Kurile Islands, north of Japan, at 10:06 a.m., eastern standard time, on Tuesday, June 30. Scientists of the U. S. Coast and Geodetic Survey, working with data collected telegraphically by Science Service, gave a preliminary epicenter determination as in 51 degrees north latitude, 160 degrees east longitude. The actual location, or focus, of the quake may have been deep beneath the surface.

Observatories reporting were those of Canisius College, Buffalo, N. Y.; Fordham University, New York City; St. Louis University, St. Louis, Mo.; the University of California, Berkeley, Calif.; Seismological Observatory, Pasadena, Calif.; Pennsylvania State College; the Franklin Institute, Philadelphia; the U. S. Coast and Geodetic Survey's stations at Ukiah, Calif., and Chicago, Ill.; the private observatory of Mrs. M. M. Seeburger, Des Moines, Iowa; Dominion Observatory, Ottawa, Canada; and the Dominion Meteorological Observatory, Victoria, B. C.

Science News Letter, July 11, 1936

ROENTGENOLOGY

X-Rays Look Inside Wide Range of Materials

LOOKING inside of all sorts of materials, from concrete to tobacco, is becoming a common task for X-rays, usually considered a tool for use of doctors in hospitals.

Foundries and welding shops use X-rays as a routine for control and inspection of the metal they produce. Earnshaw Cook of the American Brake Shoe and Foundry Company, Mahwah, N. J., told the American Society for Testing Materials meeting in Atlantic City that "the installation of X-ray laboratories in commercial jobbing foundries is an economic measure, inherently profitable to the manufacturer and a reliable assurance of improved and maintained quality to the trade."

X-rays allow the detection of holes,

cracks, inclusions and other defects in metal. With the growth of welding, X-ray equipments have multiplied for use in inspection of joints and other products made by welding.

In building the giant hydraulic power penstocks of Boulder Dam, 270,000 feet of X-ray film were used for the examination of their welded joints, J. C. Hodge of Babcock and Wilcox Company, Barberton, Ohio, told the A.S.T.M. meeting.

X-rays have solved problems in connection with ceramics, concrete, mica, coal, asbestos, foods, tobacco, plastics, textiles, paper, leather, wood and other materials, Herman E. Seemann, of Eastman Kodak Company, reported.

Radioactive substances, such as radium, giving off gamma radiation similar to but more powerful than X-rays, are also being used for non-destructive testing of materials, and Norman L. Mochel, Westinghouse engineer, predicted greater utilization of radium in materials testing, particularly where portability is an advantage.

Science News Letter, July 11, 1936

ARCHAEOLOGY

Log-Cabin Quilt Pattern Came from Ancient Egypt

MAYBE Grandmother never suspected it, but her log-cabin patchwork quilt pattern was borrowed from the Egyptians. So anthropologists at the meeting of the American Association for the Advancement of Science were told.

Mrs. Gertrude S. Evans of Freeport, N. Y., told of examining mummies of Egypt's sacred monkeys and shrews and sacred birds in collections of the Brooklyn Central Museum and the Metropolitan Museum of Art, and of finding that Egyptians wrapped these mummies in "log-cabin" designs making a pattern of strips arranged in steps around an enclosure. The origin of the idea was the pyramid tombs. A pyramid viewed from above makes this picture, and one-fourth of a patchwork quilt log-cabin square makes a pyramid in profile.

In what is believed to be the original pattern of the old-fashioned log-cabin quilt, the block contains six steps, and six steps were characteristic of an early form of Egyptian pyramid. Six steps or units have been counted in some of the mummy wrapping designs.

The pyramid pattern had a grandeur and dignity which it lent to the mummy wrappings, and later to handmade bed quilts, Mrs. Evans declared.

Science News Letter, July 11, 1936

AVIATION

Double-Decker Craft To Cruise Long Distances

WITH almost all Europe in a military airplane race and trans-Atlantic airplane mail flights promised within a time varying from a few months to three years, new interest is aroused over the new Mayo composite aircraft which the British Air Ministry is studying.

Big problem in a direct trans-Atlantic airplane crossing—and of course any long-range bombing program in general—is fuel plus useful payload.

One solution proposed has been refueling the proposed trans-oceanic plane after it has arrived at its flying altitude. The British Mayo composite airplane would achieve this same effect in a strikingly different fashion.

A giant flying boat of a type comparable to those in Caribbean or trans-Pacific service would take off with a four-motored pontoon-fitted seaplane mounted above it. The composite craft would gain flying altitude and travel some hundreds of miles, using the fuel of the flying boat. Then the two units would be detached and the seaplane would continue on its way while the flying boat would return to the home port.

Comments the technical journal, *Mechanical Engineering*, in its May issue:

"The fact that the Air Ministry seems to be officially interested in the experiment (with an eye possibly on the use of a similar combination to facilitate the start of a heavily laden long-distance bomber) suggests that the scheme has more aeronautical merits than are obvious at first sight. It is expected that flight trials of the composite aircraft will be begun in August."

The whole trend of European political events last year, adds *Mechanical Engineering*, is bound to have its effect on aeronautical development. In England, in particular, emphasis is now turning from improvements in tried and existing types of airplanes to research on completely new designs. No one talks longer in terms of 250-mile-an-hour speeds. The minimum discussed is 350 miles an hour.

The advent of scientifically-minded Germany into the international military airplane picture is one cause of this change, at least.

Science News Letter, July 11, 1936

COMPARATIVE PSYCHOLOGY

Bringing Up Baby

Chimpanzee Mama Plays With Her Infant, Teaches Him To Walk and Climb and Disciplines, But Doesn't Spank

By MARJORIE VAN DE WATER

THE chimpanzee is much more like his human kin than is any other animal. So it is not surprising to learn that Mama Chimp devotes a great deal of time to "bringing up" her baby, even as does the most enlightened human graduate of the best home economics courses.

In the chimp nursery, the mother plays with her baby. She rocks him in her arms. She disciplines him when he is naughty. She teaches him to walk and to climb. She even gives him "character training" in independence, self-reliance and good apeishness.

It is only recently that human parents have realized the importance of physical exercise for very young babies. Dr. Myrtle McGraw, in her famous experiment with the twin babies Jimmy and Johnny at Babies Hospital, New York City, demonstrated the profound effect of early exercise on physical development and probably also upon personality.

Johnny, who was trained and exercised almost from birth, far outdistanced his brother in developing certain muscular skills such as swimming and roller skating. But more than that, Johnny seemed to gain a sort of independence and "psychology of success"—at least he became much more of the go-getter type of person than his twin.

Whether or not the ape mother realizes the need for her baby to learn to stand on his own feet and to swing by his own hands, she sets about this same sort of physical training when her baby is only a few weeks old.

Vary With Individual

All chimpanzee mothers do not follow exactly the same rules for these setting-up exercises. Different individuals may start them earlier or later. They may also vary the character of the drills, perhaps suiting them to the individual infant.

But, especially at first, there is similarity in the exercises and in their sequence. Dr. Robert M. Yerkes and Michael I. Tomilin have carefully observed them in the colony of mother and

baby chimpanzees of the Yale Laboratories of Primate Biology, at Orange Park, Florida.

The first exercise is a gentle stretching of the baby's arms and legs. The mother, lying on her back, lifts the baby up in the air and slowly and tenderly stretches the tiny limbs.

Sooner or later, as the infant grows stronger, this first exercise is followed by one in which the infant's feet are placed against the mother's chest and the arms stretched up as though in an attempt to teach the little one to stand erect.

A Conservative Mother

Creeping, walking and running are taught just as they are in any nursery. Each chimpanzee mother has her own methods of teaching. A conservative, patient mother was Pati, who let her son take his own time in learning to stand alone. At first Ben worked within the safe enclosure of Pati's arms and legs as she sat on the cage floor. Next the circle was broken by the mother when she gently took away her arms and straightened her legs to give the baby more freedom of movement and to enlarge Ben's scope of action.

Finally, Ben was taken out of the safe little area before the mother and placed

at her side, where he could pull himself up by clinging to her hair.

As soon as the baby has learned to stand with his mother's help, the next step is to teach him to climb. The wire of the cages provides the "jungle gym" on which the little chimp babies at Orange Park learn.

Climbing Lessons

The mother will carry her baby to the netting, place its hand against the wire, and then cautiously withdraw, leaving the baby clinging to the wire. Dr. Yerkes tells us of the next step in a report to the *Journal of Comparative Psychology*:

"No sooner did a youngster become accustomed to grasping the netting thus instead of its mother's coat than it began to climb."

"Invariably the initial direction was upward. When the roof had been reached, the climber, helpless and baffled, began to cry and the mother would come promptly and carry it down."

"Very considerable practice was required and much experimenting before a baby could climb downward and sideways as well as upward. Days or even weeks intervened between these stages in the development of climbing. And even then climbing along the underside of the roof netting continued to be impossible, for this acquisition is much more difficult."

"Finally, however, the infant comes to



SOLICITUDE AND INDIFFERENCE

At the left is Josie, a young mother, fussing over her first baby's "bath." Contrast her engrossing interest with the bored air of Mona, the experienced mother who does not even hold her infant twins.

cling to the horizontal netting with hands and feet and to move along it cautiously with its back toward the floor. Later it learns to swing along, holding only by its hands.

Value of Example

"The value of example in the case of ceiling climbing is indicated by the fact that the colony's chimpanzee twins Tom and Helene did not master it until early in the second year of life when they were caged with Bob and Dick, who for months had been adept in this activity.

"The mother of the twins, Mona, being large, fat and relatively clumsy, never mounted to the ceiling, so previously they lacked example. When it became available to them they profited by it.

"We have many other fragments of evidence that the chimpanzee mother influences her infant by example, as well as by gestural and vocal precept or command. Instead of being permitted to develop in its own way, our chimpanzee infant is inhibited, curbed, directed, driven, or encouraged in multitudinous ways by maternal attentions."

Good mothers and bad mothers are found in the chimpanzee as in the human world. When I visited the Yale station, I saw a mother with a tiny one-day-old infant. She seemed then to be contented with the baby. But later it developed that she regarded the infant in much the same way that an energetic four-year-old boy might feel toward a rubber doll. Her rough handling eventually proved to be such a real danger to the baby that he had to be removed from her in order to insure his survival.

The young mother of a first-born infant is much more solicitous and also more nervous about the care of her baby than is the experienced mother of a large brood.

Fussing Over the Bath

Mona, whose twins came as the latest addition to a large family of offspring, treated her babies very casually. She groomed them perfunctorily and infrequently as though it were unessential. Contrasted with this, Wendy and Josie fussed eternally over the baby's "bath," grooming their infants until they were nearly denuded.

In exercising it was the same way. Pati, Josie and Wendy were devoted to it. Mona was almost wholly neglectful.

The youngest child and the first-born child in the chimpanzee family seem likely to be given unusual opportunities to develop independence—but in en-

tirely different ways! Josie, the inexperienced mother, was constantly training her baby, teaching him to walk, to climb, to run. She carried him in the most unconventional fashion as no experienced chimpanzee mother would ever carry her baby. Poor Dick would be hung over her arm as a rag doll might be flopped over the arm of a little girl. Or he was grasped by one arm or one leg and dragged along any old way. Josie was always gentle and watchful of Dick's welfare, but she just didn't seem to consider that there might be a possibility of hurting him by her unusual ways of mothering.

Another Method

Mona encouraged independence by opposite tactics. She seemed bored with babies, or perhaps overwhelmed at the double task imposed by twins. She refused to let the babies cling to her, and would not carry them unless there was real necessity. She did not even want them to hold to her hair when she was resting.

Chimpanzee mothers are very modern when it comes to the matter of disciplining the baby. Corporal punishment is very rare in the chimpanzee nursery. All the mothers exercised discipline, generally by restraint of the baby's activity. But only the irritable Mona went so far as to treat her little ones roughly. And in so doing, Dr. Yerkes comments, "she evidently hurt her own feelings as well as theirs."

Helpless Rage

When Mona was tired of the clinging babies, or wished them to fend for themselves, she would sometimes resort to this rough sort of discipline. She might brush one aside, shake it, strike it or bite its hands—never so hard as to seriously hurt it.

"Sometimes as the mother thus roughly treated her young she would scream as if in impatience or anger," the scientists said. "To us the behavior suggested impotent rage, for the infants usually complained so bitterly that they compelled their mother to relent."

Like a human bad child, when the chimpanzee infants failed to get what they wanted, they would throw themselves on the floor and scream.

"Mona seldom could long resist this infantile appeal. Manifestly struggling against conflict, she would go to the infant, take it up and for a time indulge it. Then self-interest having gained dominance, she would once more antagonize the twin and the scene would be



TEACHING HIM TO WALK

At the top Pati exercises her baby Ben and Dita shows her baby Rosy how to sit up. These are the first exercises in the chimpanzee nursery. Later come the walking lessons themselves. In the center picture, the chimpanzee mother patiently calls the baby to come to her. Next—well, she is evidently saying, "Just one more step, baby"; below, the youngster (aged five months) takes his steps alone.

repeated. Usually the infant won eventually and peace was restored."

As any well-informed modern mother might expect, it was Mona—the older mother of the large family—who clung to the now outmoded practice of rocking the babies to quiet them. When one of her infants was restless or complaining, Mona would hold her hand or arm under the baby and then move her arm rhythmically back and forth until the child was soothed to rest. The mother was so large and the babies so tiny that both twins could thus rest on one arm of the mother.

Diet a Problem

The baby's diet is a matter of concern for the chimpanzee mother as it is in the human nursery. Here is no problem of "formula" or of providing essential vitamins. Rather at first it is a problem of preventing the infant from grabbing and eating food not intended for him. There is a possibility that in thus restraining the infant the chimp mother is acting selfishly, because she wants to eat the food herself. The scientists are willing, however, to give her the benefit of the doubt and give her credit for an instance of maternal care.

At any rate, after the first few months of life, the infant is permitted and even encouraged by the mother to take supplementary feedings.

At the end of his first year, the chimpanzee infant is eating everything, although he has not yet been weaned. He eats cereal, vegetables, fruit and milk—just about the same foods that Junior begins to consume at the same age.

With the chimp baby's growing independence in the matter of food comes also an increasing tendency to be free of the mother's solicitude in other ways. Although the mother still watches over the infant, it is more likely to be from the background.

Suspicious at First

During the first weeks of the infant's life, the mother was constantly on guard, suspicious of everything and everybody whose relations to her infant she did not know. This aggressively precautionary and protective attitude is likely to disappear before the baby is a year old.

"Pati, for example, who for several months constantly guarded Ben, rarely trusting him beyond reach and almost never beyond sight, and responding instantly to any threat to him and to his calls for help, became so far indifferent to such things during the twelfth month," the scientists report, "that in-

stead of rushing to him at the first cry of alarm, she would pause to look about, and then either calmly disregard the crying or go to him slowly.

"Yet even at this time, if she observed something in the environment which seemed seriously to threaten her infant, she would hasten to him and he would hide himself in her arms."

So it is emphasized that these animals, so close to humans on the evolutionary ladder, are, like man, extremely dependent in the early months of life. Upon the mother lies the responsibility for

teaching the young infant the skills that are necessary for his survival. The chimpanzee, it appears, like the human baby must be taught to walk, to climb, to protect himself, to associate with others of his age, and even, to a certain extent, to eat.

Like the human mother, the ape protects her young, runs to answer his call or cry, remains close to his clinging arms, but later gently teaches him to loosen the baby grasp and travel independently of her.

Science News Letter, July 11, 1936

PHYSICS

Electricity of Blood Cells Enough to Light a Lamp

THE RED blood cells of man and animals as carriers of electricity are being studied at the Biological Laboratory, Cold Spring Harbor, Long Island, it was revealed before the meeting of the American Physical Society, in Rochester, N. Y.

Dr. Laurence S. Moyer and Dr. Harold A. Abramson reported that red blood cells of man, among the animals studied, have the highest effective electrical charge at their surface, equivalent to 15,000,000 electrons. Electrons are the unit charges of electricity.

Studies of the amount of electricity carried by the blood cells have an important relationship to such basic human problems as the coagulation properties of the blood and problems connected with the anemias. For example, it has been found that in certain cases of anemia in human beings, the abnormal cells apparently possess a mechanism which is capable of preserving the normal surface charge of the cell in spite of wide variations in the surface area during the course of the disease.

A good idea of the size of this surface charge may be obtained from the estimation that if the charges from blood of a full-grown man could be collected and made to pass through a 25-watt electric bulb it would burn for at least 5 minutes.

Of all the animals studied in the tests Drs. Moyer and Abramson found that the rabbit had the lowest electric charge density—only 1,890 electrostatic units. Man and the rhesus monkey (used in experimental studies of infantile paralysis) had about the same charge density,

4,500 units. The dog had the highest charge density, 5,600 electrostatic units.

Electrons Born

Sprays of electrified particles shoot out, now and then, from all kinds of matter. Rocks, metals, even our own bodies, are subject to this effect which physicists say is due to the unceasing cosmic-ray bombardment.

Disruption of atomic nuclei by the highly energetic cosmic-ray particles has been regarded as a likely explanation. The particles making up the spray were thought of as the flying debris from a shattered atom.

But it now seems more likely that the atoms remain intact during the collision and that the cosmic rays suffer the major damage. According to Dr. and Mrs. Carol G. Montgomery of the Bartol Research Foundation of the Franklin Institute the spray particles are pairs of positive and negative electrons created in that intense electric field which surrounds the nucleus of every atom. The raw material for the process is the energy of the cosmic-ray photons.

Dr. Montgomery described to the meeting experiments which he and his wife performed with a device called an "ionization chamber." Different kinds of material—lead, tin, iron, magnesium—were piled about the chamber and their electrical effects recorded on yards and yards of photographic film.

The heavier the material surrounding their chamber, the larger was the number of particles shot out in every spray. Heavier atoms have stronger electric fields about them; have greater power



MEASURING CURRENTS

Professor Harold A. Abramson with equipment for measuring the electrical charge of blood cells. The blood cells are placed into the glass apparatus on the stage of the microscope and their speed in an electric field is observed.

to rip cosmic-ray photons apart, as it were, and convert the pieces into pairs of electrons.

The reason for favoring this interpretation over that of atomic disintegration lay in the mathematical relation between the number of particles per spray and the weight (atomic number) of the ma-

terial from which the sprays came. The law which Dr. and Mrs. Montgomery found to govern cosmic-ray sprays was the same as that which others have found for the case of conversion into electrons of the gamma rays (also photons) from radioactive substances.

Science News Letter, July 11, 1936

PSYCHOLOGY

Psychologists Mass To Attack World's Social Problems

SCIENTISTS are massing their forces for a new attack on war, depressions, and unemployment. Research programs, in which several hundred psychologists will cooperate to tackle the great social problems afflicting the world today, are now being planned. Just as the great minds in the field of psychology gathered in Washington at the call of President Wilson to attack the major psychological problems of the World War, so today psychologists are gathering for a similar concerted action against the social conditions that threaten peace and progress, and even civilization itself.

More than 200 psychologists from American universities have already

joined in this great movement. They plan to organize a national society next September.

War Psychological

War, such as the one now seriously threatening Europe and the whole world, involves psychological problems, these scientists believe. Popular notions about man's instincts and emotions may be so incorrect as to have grave significance for the control of war. These are the contentions of Dr. I. Krechevsky, psychologist of the University of Chicago, who is a member of the committee organizing this movement.

"Economists, politicians, physicists, editorialists, munitions manufacturers,

and 'philosophers' have not hesitated to advise society on problems of social motivation, the inevitability of war as 'inherent in human nature,' and the like," Dr. Krechevsky said. "What psychologists have come forth to substantiate or refute these psychological 'laws'?

"These are important psychological questions in themselves. That their answers may have important social implications does not make them any less so and should not frighten us away from them.

"There is, we believe, a definite need for an organization to encourage, promote, and support, both financially and 'morally,' such research."

Started Last Fall

The germ of this new mass movement on economic and social problems was first observed last fall at the annual meeting of the American Psychological Association at Ann Arbor, Mich. Hundreds of petitions were submitted to the association from universities all over the nation protesting against the "waste of human minds" when scientifically-trained men were put to work at "leaf-raking" or even allowed to sit idle and useless while the nation suffered under the depression.

President Roosevelt and other spokesmen of the New Deal were quoted as pointing to fear and the panic of human minds as the basic cause for the great economic depression of the nation. Yet despite this general recognition of the psychological nature of the problem, psychologists have not taken an active part in the government's attempts to cope with it.

There are no psychologists among the brain-trusters, it was pointed out by Dr. A. T. Poffenberger of Columbia University in his address as president of the American Psychological Association.

Psychologists Under Cover

"The success of the psychological contribution depends upon how well it is kept under cover," Dr. Poffenberger said, referring to the employment in the government service of psychologists as "statisticians" or "economists" instead of openly as psychologists. However valuable the psychological work may be, diplomacy dictates that it shall function under an assumed name." But the employment of psychologists in even this "left-handed" way is the exception rather than the rule.

During the crisis of the Great War, psychologists met in Washington and worked out a plan in record time for making a psychological assay of the hu-

man resources of the nation for the purposes of war. Although it was necessary to do pioneer work in developing tests for the purpose, within a few months these psychologists made possible a sorting of men into the jobs where they were best fitted to serve the nation.

In the present emergency, with millions of Americans unemployed and other millions compelled to accept relief because they are "unemployable," psychologists even after more than six years have not yet made a fair beginning on the problem.

"When the question of waging a successful war was concerned, psychologists were urged to help," said Dr. Krechevsky. "When the question involves an attempt to save a nation from moral, economic, and cultural disaster, which in turn involves a scientific re-examination of fundamental principles and concepts of the social order, the scientist, his disciplined opinions, and his technical skills are dispensed with."

It is to bring the cold, impartial light of science to bear on these vital problems about which theorists have argued in vain, that the new movement has been organized. The following is the official statement of the purpose of the new national society:

Purpose of New Society

"To work effectively for both the immediate and ultimate freedom of psychology to do its utmost to make contemporary American society intelligible to its members, and to suggest and test hypotheses regarding desirable social change.

"To promote and protect objective and scientific psychological research on controversial topics, especially in the central fields of economics and politics—national and international.

"The administration of timely referenda (such as a referendum now planned to feel out present attitudes of the public toward war).

"The encouragement of the discussion of the application of the findings of psychology to the problems of social order."

This great movement for the application of science to the solution of vital social problems has precedence in a movement also inaugurated in the fall of last year among 339 psychiatrists of 30 nations. With the backing of the queen of The Netherlands, these physicians to the human mind began an attempt to combat what they termed the insanity of war. This movement has aroused considerable interest among psychiatrists and psychologists in the United States, some of whom have taken an active part in it.

Committee Personnel

The members of the committee arranging formation of the new organization are as follows:

Drs. Gordon Allport, Harvard; J. F. Brown, University of Kansas; Leonard W. Doob, Yale; Franklin Fearing, Northwestern; Ward Halstead, University of Chicago; George W. Hartmann, Pennsylvania State College; I. Krechevsky, University of Chicago; Walter A. Lurie, New Orleans; Norman R. F. Maier, University of Michigan; Lorenz O. Meyer, Chicago; Karl F. Muenzinger, University of Colorado; Marion W. Richardson, University of Chicago; Floyd L. Ruch, University of Illinois; Theodore C. Schneirla, New York University; Ross Stagner, University of Akron; Harry C. Steinmetz, San Diego State College; Edward C. Tolman, University of California, and Goodwin Watson, Teachers' College, Columbia University.

Science News Letter, July 11, 1936

It is reported that three-fourths of the totem poles sold to tourists in Alaska are made in the Orient, because Alaskan Indians have not yet gone into the craft trade on a large enough scale.

ECOLOGY
NATURE RAMBLINGS
by Frank Thone



Survival of the Longest

DROUGHT again underlines one type of natural selection that regularly comes into play on the Prairies and Plains in years of scanty moisture. Survival of the fittest, at such times, is to a considerable extent survival of the longest-rooted.

Plants of the open grasslands in general have roots much longer than their tops are high. Foot-high native grasses often have roots three or four feet long; two-foot-high wild roses and other shrubs drive their roots as much as eighteen feet into the subsoil, where moisture persists even after it has been dried out of the top layers.

This has a particular bearing in the question of crop plants. Crops that we plant in plowlands are usually shorter-rooted than their wild prairie competitors that we carefully exclude as weeds. Thus spring wheat is blighted, while bluestem and grama-grass survive. An exception is corn, which often produces five- or six-foot roots, so that we have seen corn "getting by" until now, while small grains suffered.

Of course long roots are not the only thing that makes for drought resistance; neither can they save the plant if the subsoil moisture joins the topsoil moisture in evaporation-flight to the brazen and pitiless sky. Even when water is still available, corn leaves may be burned and curled by hot winds that cook the sap out of them faster than new supplies can be drawn up from the roots. For this reason, plant breeders strive for tough-fibered, stout-skinned leaves and stems while they also keep an eye on depth of roots.

The present drought will put another arrow in the quiver of ecologists who have been arguing for the restoration of the old native sod cover on western pasture lands, to replace the juicier but

■ SUBSCRIPTION ORDER COUPON ■

To Science News Letter, 2101 Constitution Avenue, Washington, D. C.

Please start my subscription to SCIENCE NEWS LETTER for 2 years, \$7
 renew 1 year, \$5

Enclosed find check

Please send bill

Name _____

Street
Address _____

City and
State _____

Extra postage charges: 50c a year in Canada; 75c a year in foreign countries.

shallower-rooted introduced grasses. The latter pay bigger profits when there is plenty of rain, but their failure imposes correspondingly bigger penalties when the rains fail.

Even trees fall in line with the lowlier plants, in this business of deep rooting in regions subject to recurring droughts. Botanists at the University of Nebraska not long ago dug down among the roots of bur-oak trees, those tough pioneers that march out into the prairies where no oak else will venture. They found that every tree was virtually two trees: the tree of branches above ground matched by a tree of roots below.

Science News Letter, July 11, 1936

PUBLIC HEALTH

Cities Watch Seattle Meat Grading Experiment

SEATTLE'S experiment in requiring meat to be graded, watched by cities throughout the country, is giving the public better beef with no advance in price. So the American Home Economics Association, meeting in Seattle, was told by Dr. F. E. Smith of the Seattle Department of Health and Sanitation.

Seattle is the first city in the United States to make the grading of beef, mutton, and lamb compulsory, Dr. Smith stated. The system, now in use a year and a half, was developed by the U. S. Bureau of Agricultural Economics with the idea of marking meat in a common language understood by both buyer and seller.

Describing the meat grading system as "a service rendered to consumers, which protects them against fraud and misrepresentation," Dr. Smith said that opposition to the system continues "stubborn and persistent."

"From the standpoint of the national packer, grading is opposed," he said, "because it interferes with promotion of his own brands. Opposition developed by the retailer comes principally from the dealers who handle beef, mutton, or lamb of the medium grade or lower."

Science News Letter, July 11, 1936

ORADIO

July 14, 2:15 p.m., E.S.T.

UNPOPULAR WEATHER—J. B. Kincer of the United States Weather Bureau.

July 21, 2:15 p.m., E.S.T.

SOMETHING NEW IN COTTON—R. W. Webb, Senior Cotton Technologist, U. S. Bureau of Agricultural Economics.

In the Science Service series of radio discussions led by Watson Davis, Director, over the Columbia Broadcasting System.

• First Glances at New Books Additional Reviews On Page 32

Exploration

ARCTIC ADVENTURE: MY LIFE IN THE FROZEN NORTH—Peter Freuchen—Farrar and Rinehart, 467 p., 112 illus., \$3.50. "If the Arctic is at all appealing to a person, it exercises a spell over him," writes this man who has certainly seen the North at its best and worst. Some of this spell he manages to cast on the reader, for the book is of the type "hard to lay down." Particularly memorable is the story of Freuchen singing for his life to scare off wolves every time he left his Greenland cabin, where he was taking weather observations. His married life with an Eskimo woman and his experiences with famous explorers stress the human touches of life in a strange world.

Science News Letter, July 11, 1936

toric setting, and this is carried out by systematic presentation of facts and points, often in outline system. The "individual worth" of chief Bible characters is also evaluated by the author's summarizing method.

Science News Letter, July 11, 1936

Child Study

THE BABY AND THE GROWING CHILD—Louis Fischer—Funk & Wagnalls, 260 p., \$1.50. This book gives detailed instructions on feeding and otherwise caring for infants and young children, including measures for dealing with various emergencies before a physician arrives and useful information about various diseases of children.

Science News Letter, July 11, 1936

Geography

HAMMOND'S PICTORIAL ATLAS OF THE WORLD—Hammond, 160 p., \$1. A handy-sized reference book, up-to-date to the inclusion of Boulder Dam reservoir and the dam that changed Holland's Zuider Zee into a fresh water lake. The maps are detailed enough to be very serviceable, and the short descriptive accounts of the various countries with illustrations are a good feature.

Science News Letter, July 11, 1936

Hygiene

SEX HABITS—A. Buschke and F. Jacobsohn—Emerson Books, 204 p., \$2.50. Besides a clear presentation of the anatomy and functioning of the sex organs and a discussion of sex hygiene, this book includes a chapter on abnormalities of sexual life, one on prophylaxis against venereal disease, and several chapters on heredity, eugenics and racial hygiene.

Science News Letter, July 11, 1936

Education

HANDBOOK OF ADULT EDUCATION IN THE UNITED STATES, 1936—Dorothy Rowden—American Association for Adult Education, 423 p., \$1.75 to members of the Association, \$2.25 to others. More than 30 writers have contributed new material to this 1936 edition.

Science News Letter, July 11, 1936

Immunology

IMMUNOLOGY—Noble P. Sherwood—Mosby Co., 608 p., \$6. A technical book for medical students and others whose training in bacteriology and related sciences will enable them to understand the subjects discussed.

Science News Letter, July 11, 1936

Bible History

THE BIBLE AND THE HISTORICAL DESIGN—Mabel A. Dominick—Printed by Plimpton Press, Norwood, Mass., 288 p., \$2.85. A book for reference and study use rather than general reading. The plan of the book is to show the relationship of Bible narrative to its his-

THE IDENTITY THEORY

By Blamey Stevens

Dear Scientist:

If you are perfectly satisfied that nothing can shake your confidence in the Relativity and Quantum Theories it will be a waste of your time to read "The Identity Theory." The book is only intended for physical scientists who can be convinced by reasonable arguments that they have been using makeshift theories all their lives.

8vo. 248 pages, cloth bound. Price \$2.00 post paid. Sixteen page summary free on application

Published by Sherratt & Hughes, Manchester, England. Also on order from the author at 438 W. 116th St.

New York City

*First Glances at New Books

Additional Reviews
On Page 31

Pronunciation

WHAT'S THE NAME, PLEASE?—Charles Earle Funk—*Funk & Wagnalls*, 176 p., \$1. Have you ever wondered how to pronounce the names of Father Coughlin, Paul de Kruif, the Dionne quintuplets, Ales Hrdlicka, Emil E. Hurja, Harold L. Ickes, Sir James H. Jeans, or Fiorello H. La Guardia? Here is a life-saver for those who must use the names of prominent persons in public speech.

Science News Letter, July 11, 1936

Industrial Hygiene

HEALTH AND HUMAN PROGRESS—René Sand—Translated by C. F. Marshall—*Macmillan*, 278 p., \$3. Unfortunately, this excellent book will probably appeal chiefly to professional workers in public health and sociology because although not technical it takes up mainly factors influencing the health of industrial workers. It should be read by a far wider group, however, because the health of one class cannot fail to affect the health of the entire population to some extent. The book is particularly worth reading in this day when social problems are so much under discussion.

Science News Letter, July 11, 1936

Sociology

WORLD IMMIGRATION—Maurice R. Davie—*Macmillan*, 588 p., \$3.75. Immigration is generally between continents rather than between nations, Europe and Asia ordinarily providing the source of such movements with the other parts of the world receiving the floods or the trickles of human migration. This is a world-wide problem affecting every nation profoundly. It is here discussed from the point of view of those in the United States.

Science News Letter, July 11, 1936

Pharmacy

THE PHARMACOPOEIA OF THE UNITED STATES OF AMERICA; 11th Decennial Revision—U. S. Pharmacopeial Convention—*Mack Printing Co.*, 676 p., \$5.

Science News Letter, July 11, 1936

Medicine

PRINCIPLES AND FOIBLES OF CANCER RESEARCH IN REGARD TO ETIOLOGY AND NATURE—William Rienhoff, Sr., *Waverly Press*, 200 p., \$2.50. A book for physicians, not laymen, in which the author reviews the many theories and

facts about cancer, points out the weaknesses and danger spots in certain lines of reasoning about this problem, and concludes with a résumé of what he considers salient facts and fruitful lines for further investigation.

Science News Letter, July 11, 1936

Botany

PLANT WELFARE—Victor H. Ries—*Doubleday, Doran*, 96 p., \$1. The home gardener, harassed by insects and fungi all bent on murdering his pet ornamentals, will find much solace in this small book. It tells and pictures what the pests are and how to combat them, states what is in the most commonly used trade-name insecticides, lists up garden herbs, shrubs, and trees alphabetically, giving with each the principal ills its flesh is heir to and what to do about them.

Science News Letter, July 11, 1936

Chemistry

ANNUAL REVIEW OF BIOCHEMISTRY, Volume V., 1936—Ed. by James Murray Luck—*Annual Review of Biochemistry, Ltd.*, 640 p., \$5. Continuing the editorial policy successfully pursued in this significant series, there are presented here close-packed summary chapters on biological oxidations and reductions, enzymes, X-ray studies, the chemistry of various biologically important compounds, metabolism, pigments, micro-organisms, etc. Extensive literature reference lists accompany each chapter.

Science News Letter, July 11, 1936

Physiology

ELEMENTARY HUMAN PHYSIOLOGY—Sherburne F. Cook—*Harper*, 539 p., \$3.50.

LABORATORY MANUAL IN ELEMENTARY HUMAN PHYSIOLOGY—Sherburne F. Cook and Mary-Alice Burmester—*Harper*, 76 p., 50c. A new text for use in college classes; not for general lay reading.

Science News Letter, July 11, 1936

Pharmacy

THE NATIONAL FORMULARY; 6th Ed.—American Pharmaceutical Association—*Mack Printing Co.*, 556 p., \$5.

Science News Letter, July 11, 1936

Astronomy

ASTRONOMY FOR THE LAYMAN—Frank Reh—*Appleton-Century*, 308 p., \$3. A book for the lay star-lover, well illustrated with halftones and diagrams of individual constellations, the text is liberally interspersed with quotations from star-poetry from all ages.

Science News Letter, July 11, 1936

Chemistry

THE ROMANCE OF CHEMISTRY; 2nd ed., Rev.—William Foster—*Appleton-Century*, 497 p., \$3. A new edition of a successful popular book about chemistry, its importance in the world, and its significance as an element in our cultural life.

Science News Letter, July 11, 1936

Eugenics

LAW OF LIFE—Halliday Sutherland—*Sheed & Ward*, 270 p., \$2.50. This book takes up marriage, birth control, heredity, alcohol, the Malthusian doctrine and similar related topics, concluding with a chapter on euthanasia. The author argues against euthanasia, sterilization of the unfit, and birth control by any but the "rhythmic" method.

Science News Letter, July 11, 1936

Pedology

PEDOLOGY—Jacob S. Joffe—*Rutgers University Press*, 575 p., \$5.25. This is distinctly a book for the serious student, not for the amateur. It contains, as probably no other single volume in English does, a comprehensive study of soils, their origins, character, types, and uses. Particularly impressive to a relative stranger to this special discipline is the Russian contribution, both as recorded in bibliography titles (there are hundreds of them) and as embedded in the technical terminology.

Science News Letter, July 11, 1936

Botany

THE IRISES OF SOUTHEASTERN LOUISIANA—Percy Viosca, Jr.—*Southern Biological Supply Company*, 56 p., 50c. A brief floristic and ecological discussion of a region very important for the genus *Iris*, by one who knows it thoroughly.

Science News Letter, July 11, 1936

Science News Letter will secure for its subscribers any book or magazine in print which was published in the United States. Send check or money order to cover regular retail price (\$5 if price is unknown, change to be remitted) and we will pay postage in the U. S. When publications are free, send 10c. for handling. Address Book Dept., Science News Letter, 2101 Constitution Avenue, Washington, D. C.